Internal and Emergency Medicine (2019) 14:1359–1362
https://doi.org/10.1007/s11739-019-02119-y

CE - LETTER TO THE EDITOR

Fahr's syndrome: a case of unwanted calcium in the brain

Kamal Kant Sahu[1] · Ajay Kumar Mishra[1] · Amos Lal[1] · Rahul Gandhi[1]

Received: 5 April 2019 / Accepted: 27 May 2019 / Published online: 1 June 2019

Dear Editor,

We read with great interest, the recent article by Koratala et al. published in your esteemed journal [1]. Through our letter, we aim to discuss additional facts and newer developments with regards to Fahr's syndrome.

A 70-year-old woman with past medical history of hypertension and hyperlipidemia presented to emergency room after sustaining a mechanical fall while attempting to get up from a chair. She denied any loss of consciousness, involuntary limb movements or blurring of vision. Her vitals at presentation were normal except for high blood pressure of 150/80 mm Hg. Physical examination was unremarkable for any focal neurological deficits, fractures or lacerations. Computed tomography (CT) did not reveal any parenchymal bleed or acute intracranial process. However, there was an incidental detection of extensive calcification of the bilateral basal ganglia (BG) and cerebellum (Fig. 1a, b). Re-evaluation of the patient was done with a detailed history and physical examination. Laboratory investigations for possible causes of BG calcification such as hypoparathyroidism, hypothyroidism, heavy metal poisoning, infections, hypervitaminosis and other neurodegenerative disorders were conducted. As there was no family history of similar illness and above-mentioned blood work were normal, a final diagnosis of idiopathic basal ganglia calcification (IBGC) or Fahr's syndrome was made.

✉ Kamal Kant Sahu
drkksahu85@gmail.com

Ajay Kumar Mishra
ajay.mishra@stvincenthospital.com

Amos Lal
manavamos@gmail.com

Rahul Gandhi
Rahul.gandhi@reliantmedicalgroup.org

[1] Department of Internal Medicine, Saint Vincent Hospital, Worcester, MA 01608, USA

Fahr's syndrome was named after a German pathologist in 1930. It is considered as an extremely rare neurodegenerative disorder with an approximate prevalence of less than 1/1,000,000 [2]. All cases of basal ganglia calcification (BGC) should undergo a dedicated neurological examination and a comprehensive laboratory workup. To prevent any irreversible neurological deficit, it is extremely important to not miss the treatable etiologies.

Figure 2 mentions about the major categories for BGC. Hypoparathyroidism, hypothyroidism, lead poisoning, hypervitaminosis D, infections are few treatable causes which if timely diagnosed could be extremely rewarding. Once known metabolic, toxic, infectious, and endocrinologic causes are ruled out, the rarer genetic disorders such as neurofibromatosis, tuberous sclerosis, Cockyane syndrome should be considered [3, 4]. Amongst the genetic disorders, Wilson's disease is a classical example of treatable condition and hence should be considered in all young patients with deranged liver functions and BGC. If despite extensive laboratory workup, the cause for BGC remains unclear, then the possibility of idiopathic basal ganglia calcification (IBGC), also known as bilateral striopallidodentate calcinosis, or Fahr's syndrome should be considered [3, 4]. Primary familial brain calcification (PFBC) is a familial form of IBGC which runs in an autosomal dominant fashion. Fahr's syndrome is idiopathic in origin and has no association with any known calcium, phosphorus or copper metabolism abnormalities.

For almost a century, no major studies pertinent to pathophysiology of calcium deposition were done, however, recently researchers have claimed Fahr's syndrome to be a dynamic disease rather than just a metastatic calcium deposition. Studies by Batla et al. and Ramos et al. showed genetic mutations in almost 50% cases of PFBC namely SLC20A2 (~40% cases), PDGFB (~11% cases), PDGFRB (~2% cases), and XPR1 (~2% cases) [5, 6]. Importance of these mutations are still a topic of research but till now, the two most important clinical associations reported are PDGFB mutations with headache, and SLC20A2 with parkinsonian features and stroke [5–7].

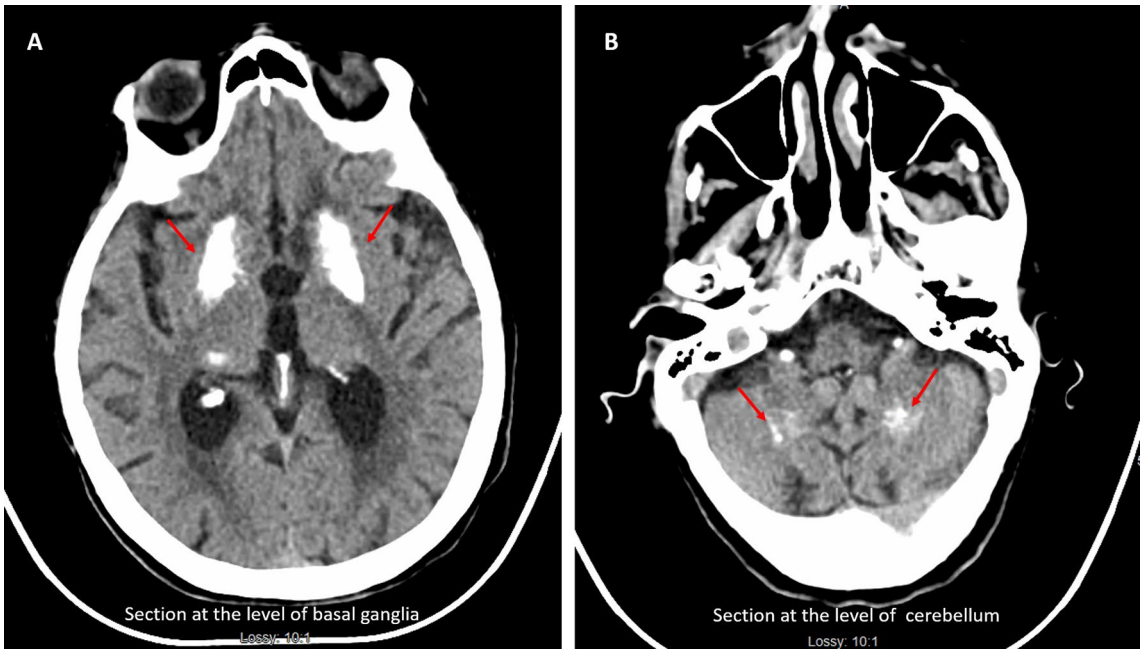

Fig. 1 Non-contrast CT head showing extensive bilateral **a** Basal ganglia and **b** Cerebellar calcifications

In most cases, presenting features of Fahr's syndrome are similar to any other neurological disorder such as dysarthria, chorea, tremor, dystonia, dyskinesia, tremors, and seizure. Hence, Fahr's syndrome could be easily confused with other more common neurological and psychiatric disorders [8]. It is important to note that while MRI is extremely sensitive to delineate the soft tissue pathologies it can still miss the calcification. Hence, when the suspicion for Fahr's syndrome is high, it is always better to evaluate with a CT brain to look for BGC. Classical radiological signs are very helpful in the diagnosis of many rare diseases [9–11]. No definitive treatment is available to date for Fahr's syndrome. Avoidance of drugs which could aggravate extrapyramidal symptoms and use of anti-Parkinson medications like levodopa could be beneficial and improve quality of life. With an increasing interest amongst researchers on the genetic perturbations in

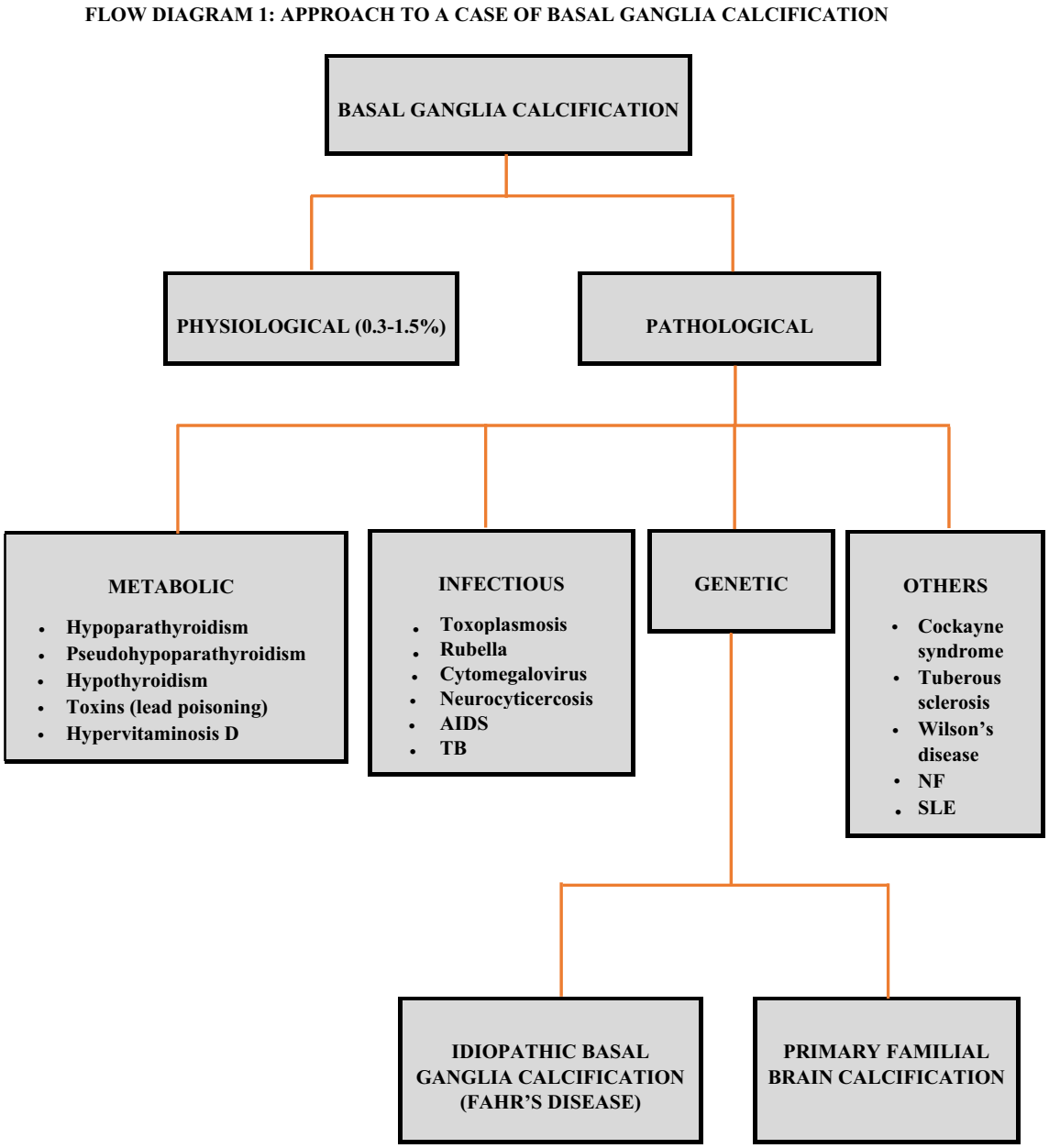

Fig. 2 Approach to a case of basal ganglia calcification

BGC, through this letter we endorse for more clinical trials on modifier genes to identify new therapeutic targets in Fahr's syndrome.

Compliance with ethical standards

Conflict of interest The authors have no conflicts of interest to declare.

Ethical approval The article does not contain participation of any human being and animal.

Statement of human and animal rights No human or animal right violation was done during the writing of this script.

Informed consent Patient consent was taken.

References

1. Koratala A, Morales Lappot J (2019) Fahr's syndrome. Intern Emerg Med 14(3):483–484
2. Pedersen AT, Kledal I, Penninga L (2018) Fahr's syndrome in a greenlandic inuit. J Belg Soc Radiol 102(1):7

3. Verulashvili IV, Glonti LSh, Miminoshvili DK, Maniia MN, Mdivani KS (2006) Basal ganglia calcification: clinical manifestations and diagnostic evaluation. Georgian Med News 140:39–43 **(Russian)**
4. Manyam BV (2005) What is and what is not 'Fahr's disease'. Parkinsonism Relat Disord 11(2):73–80
5. Batla A, Tai XY, Schottlaender L, Erro R, Balint B, Bhatia KP (2017) Deconstructing Fahr's disease/syndrome of brain calcification in the era of new genes. Parkinsonism Relat Disord 37:1–10
6. Ramos EM, Oliveira J, Sobrido MJ, et al (2004) Primary familial brain calcification. In: Adam MP, Ardinger HH, Pagon RA, et al. (eds) GeneReviews® [Internet]. SUniversity of Washington, Seattle, pp 1993-2019 (**Updated 2017 Aug 24**)
7. Zhang X, Ma G, Zhao Z, Zhu M (2018) SCL20A2 mutation presenting with acute ischemic stroke: a case report. BMC Neurol 18(1):11
8. Subedi S, Mukhi S, Pandey P (2018) Fahr's disease presenting with manic symptoms. JNMA J Nepal Med Assoc 56(209):553–555
9. Sahu KK, Varma SC (2015) Cortical vein thrombosis in a case of idiopathic thrombocytopenic purpura. Platelets 26(4):374–375
10. Sahu KK, Sherif AA, Lopez CA (2019) Omega sign: Radiological appearance of sigmoid volvulus. J Med Imaging Radiat Oncol 63(1):82–83
11. Sahu KK, Sherif AA, Mishra A, Vyas S (2019) Intestinal obstruction secondary to ventral hernia. Balkan Med J 36(3):198